

Cedar Rapids Flood Risk Management: A Case Study in Flood Disaster Recovery

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2008 Cedar River Flood

- Largest historical flood of Cedar River at Cedar Rapids
- Cedar River flood stage: 12'
- 2008 Cedar River flood: 31.12' (6/13/08)
- Highest flood pre-2008: ~20'. 2008 event was unprecedented.
- Iowa's largest flood disaster – loss estimate of \$5.4 billion

EPIC REBIRTH

10 years after the historic flood of 2008, we reflect on the progress made, and what is left to be accomplished.



Scroll down for content.



10-YEAR ANNIVERSARY SPECIAL FEATURES

| | | | | | | | |
|---|---|--|--|---|---|---|---|
|  <p>EPIC REBIRTH COMMUNITY EVENT</p> | <p>EPIC REBIRTH COMMUNITY EVENT</p> |  | <p>Interactive: How have property values changed in Cedar Rapids post flood?</p> |  | <p>Gazette reporters remember covering the flood.</p> |  | <p>Before and After: Browse interactive photos of flood recovery.</p> |
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Cedar Rapids Gazette, June 12, 2018

Rationale, Logic, Scope

- Flood Risk Management – What has been learned? Lessons for other communities?? Frame of comparison for future assessments? What influenced decisions and actions in Cedar Rapids?
- “Resilience” – How defined? What are some specifics?
- Are there water management objectives and connections across the watershed? IWRM?
- No single paper or document summarizing post-2008 Cedar Rapids flood recovery actions and initiatives

Cedar River and Watershed



LEGEND

- Cedar River Watersheds
- Cities
- Counties

- CITY OF CEDAR RAPIDS FEASIBILITY STUDY -

Kilometers: 0 20 40

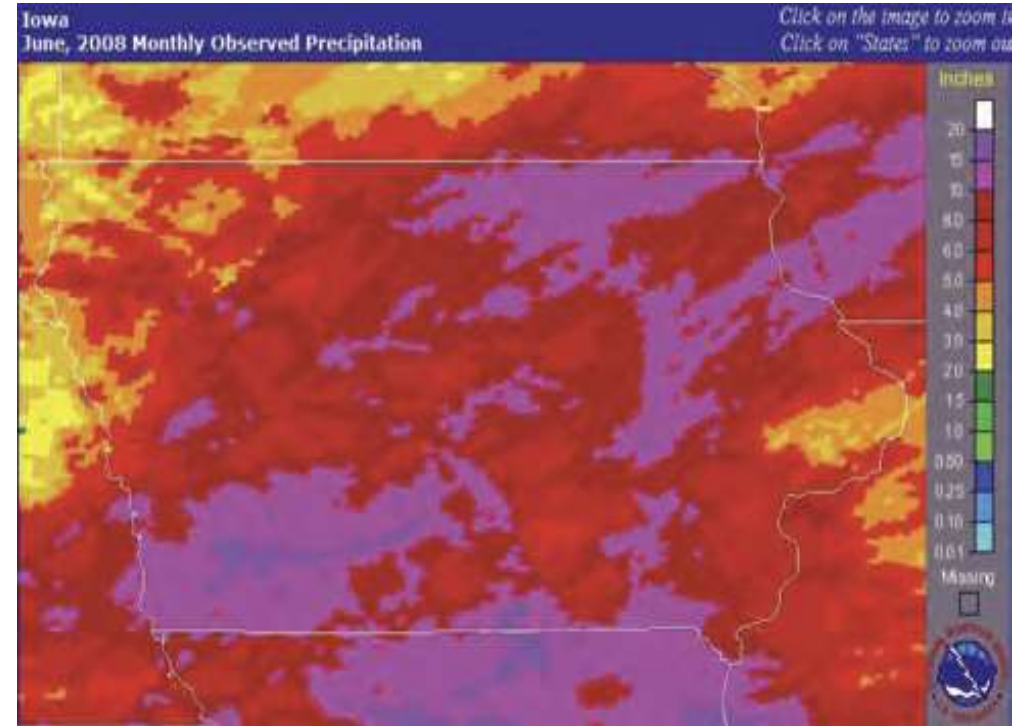
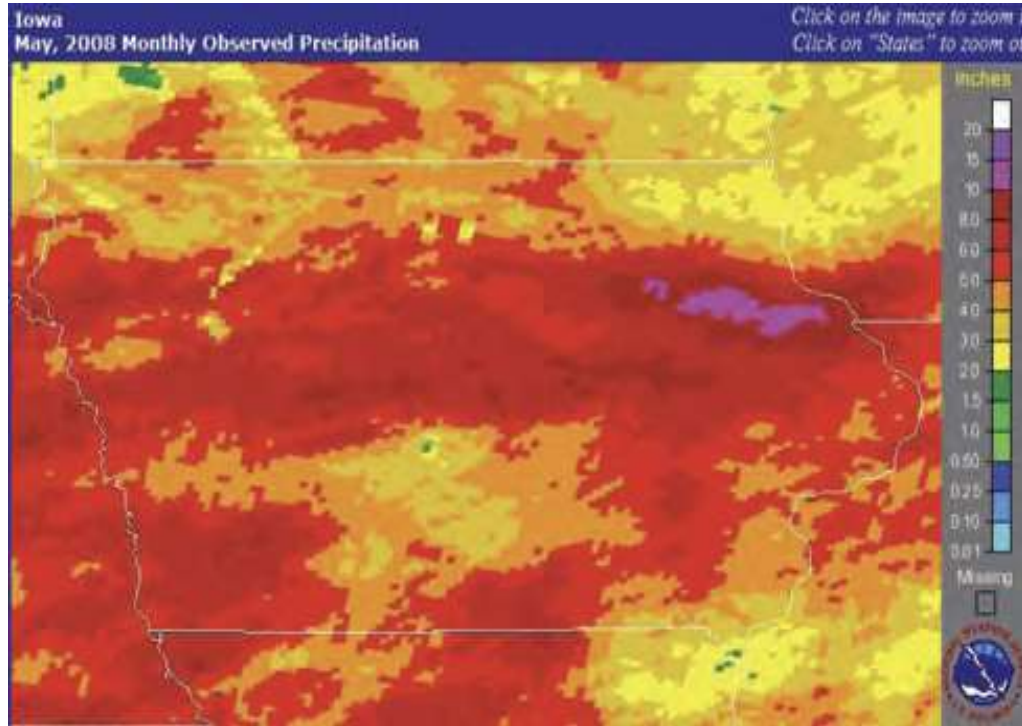
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US Army Corps of Engineers
The Water Division

City of Cedar Rapids

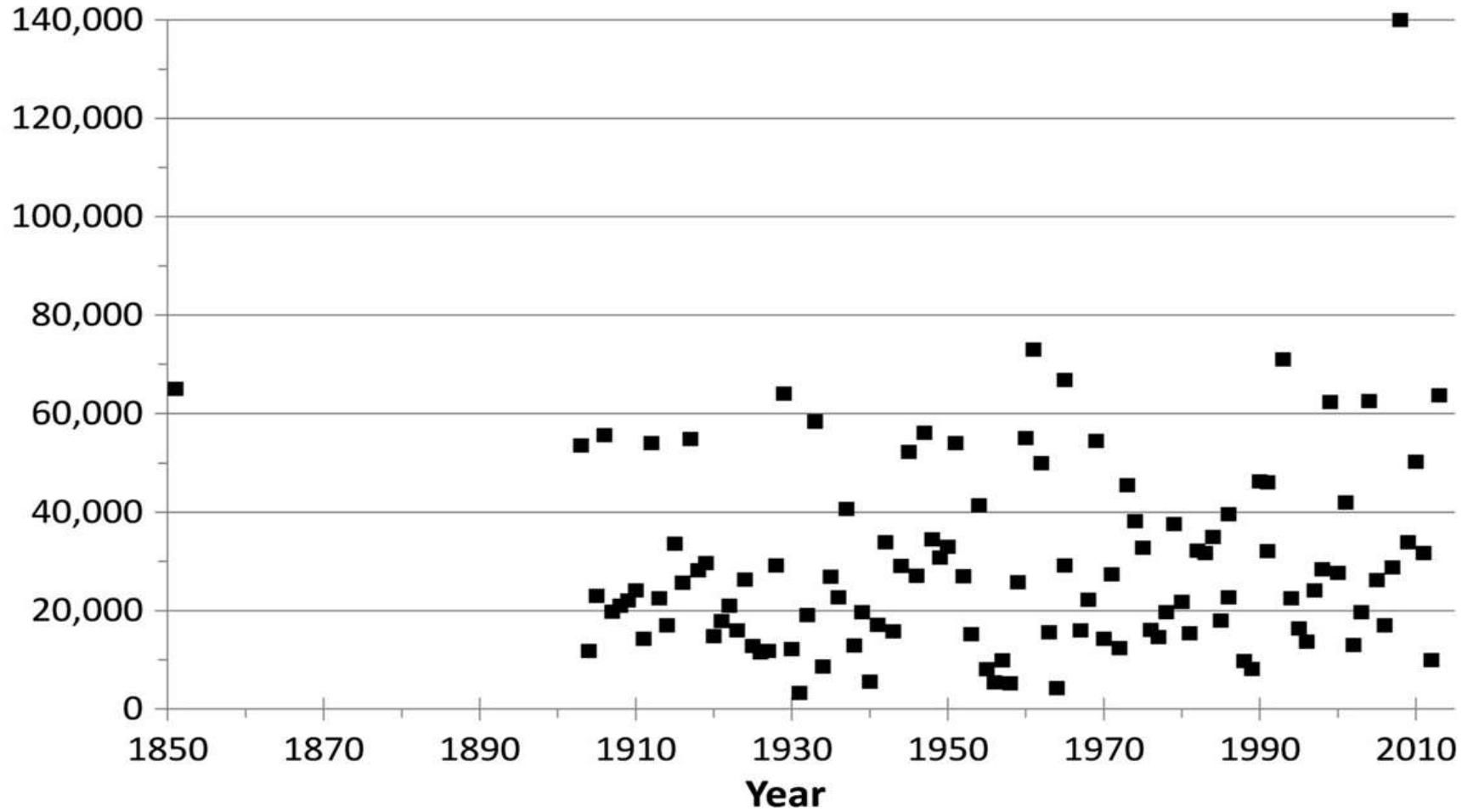
- Iowa's 2nd largest city – >250,000 in metropolitan area
- National leader in ag. commodity processing & distribution (corn and soybeans). ADM, Cargill, ConAgra, Ingredion, Quaker Oats
- Rockwell Collins avionics
- Insurance firms
- CRST
- Two large hospitals
- Eastern Iowa airport

Iowa Precipitation Amounts, May and June 2008



“Iowa endured an exceptionally wet period from May 29-June 12, 2008 when a statewide average of 9.03” of rain fell (normal for the period is 2.45”).
Buchmiller and Eash, 2010.

2008 Cedar River Flood



Cedar River Peak Annual Discharge (USACE)

2008 Cedar River Flood

No longer an island





**Downtown Cedar Rapids 6/12/08.
Photo by Steve Pope, Associated Press.**

**The Cedar River becomes the
Mississippi River!**

Cedar River 2008 Flood



Damages to Water Infrastructure

- Water Pollution Control (WPC) facility was submerged. Main lift pumps offline for 12 days. City's main water supply system never went fully offline, however.
- City's 45 vertical water wells were submerged and damaged.
- Three of four main water collector wells were submerged and damaged.
- Stormwater system backed up funneled flood waters throughout the city.

Property Damages

- > 5,000 homes affected by flood waters
- ~ 1,600 residential properties (west side) were heavily damaged, most of them declared total losses
- Dozens of businesses (west and east side) were heavily damaged

Post-2008 Setting and Responses

- City discussed taxation proposals to assist affected property owners
- City water utility and other experts began work toward more standard protocols for actions during rising flood waters; making work with contractors during flood emergencies more routine & systematic
- **Presidential Disaster Declaration** (Stafford Act 1988)
- Emergency supplemental funds became available via FEMA and HUD, which were used to fund substantial improvements across the city*

Water Infrastructure Improvements

- New levee constructed around WPC facility (85% funds from FEMA)
- All water wells were raised (3' above water level of 2008 flood)
- New motors, electrical equipment, & protective covers installed on all wells
- New sluice gates installed as part of stormwater management system

Voluntary Property Buyout Program

- Over 5,000 homes affected/damaged by floodwaters
- Presidential disaster declaration / emergency supplemental funds available through FEMA Hazard Mitigation Grant Program (HMGP)
- Funds also available via HUD's Community Development Block Grant Disaster Recovery (CDBG-DR) program
- Voluntary Buyout Program begun in 2009

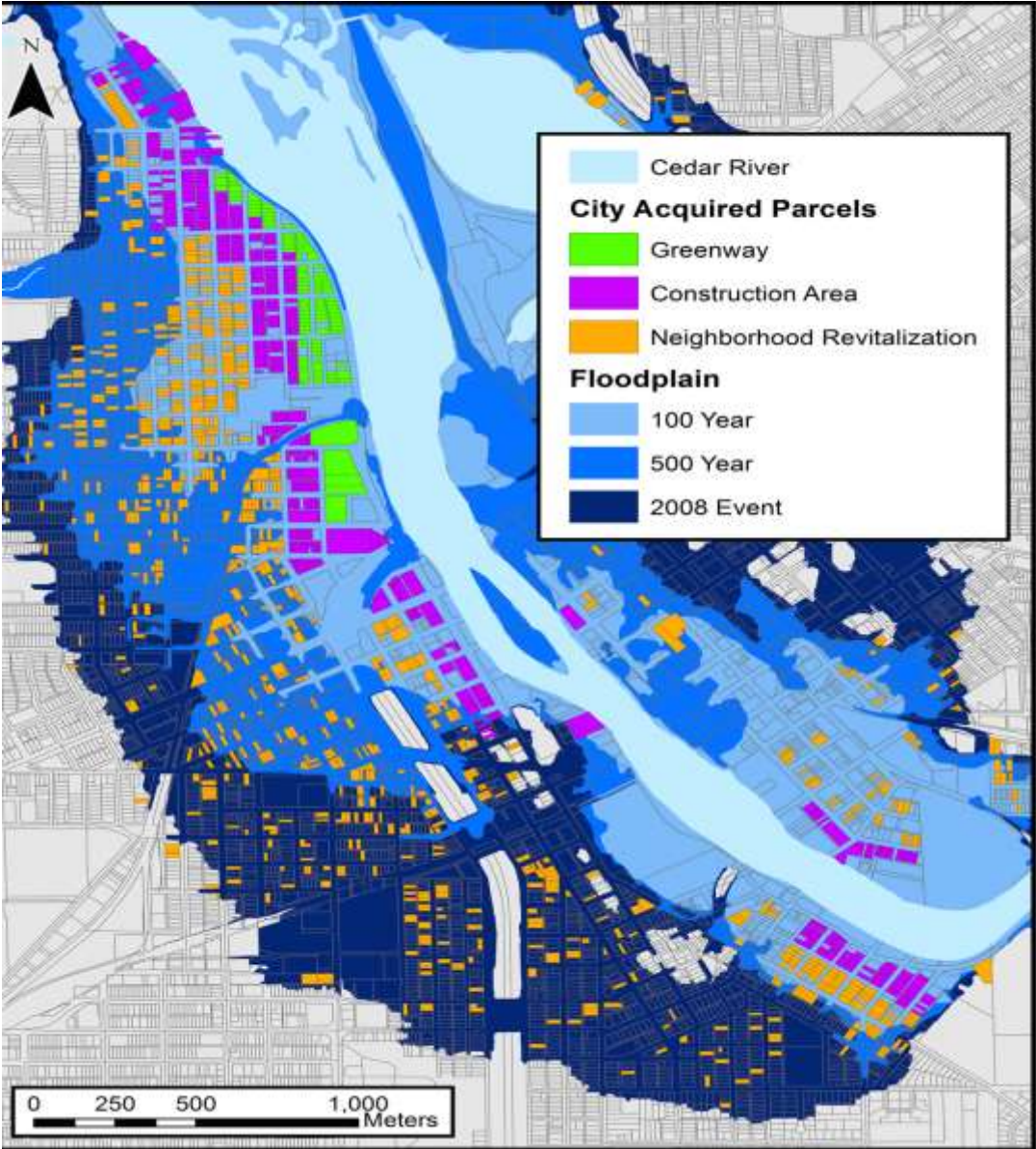
Voluntary Buyout Program (cont.)

- Property owners were offered 107% of pre-flood assessed value
- Program was completed in 2014
- Expenditures of ~\$94M
- City of CR acquired ~1,300 properties, most of which were demolished
- Most of the parcel sites have reverted to open space into perpetuity





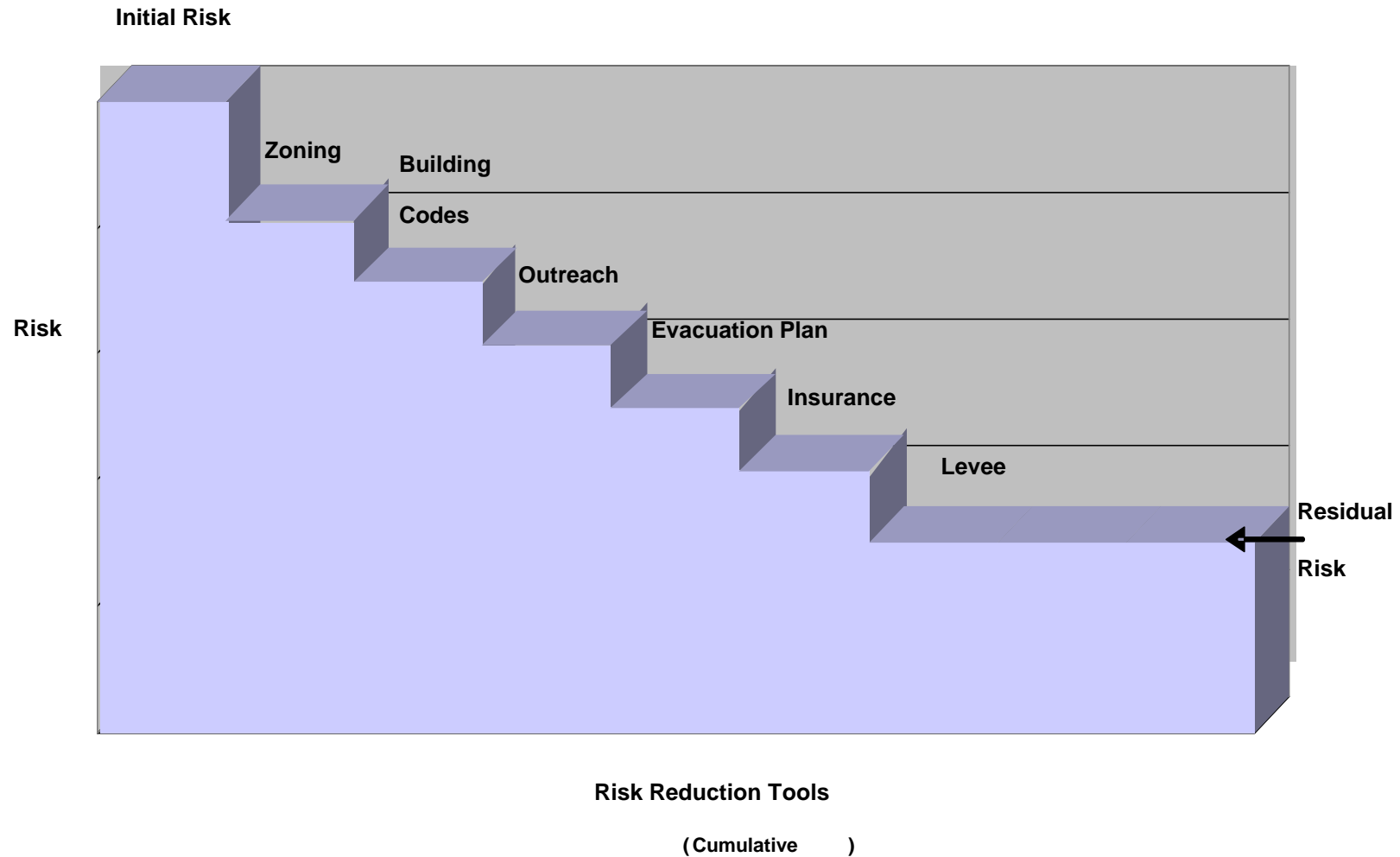
CR Redevelopment Areas, Flood Zones, Acquired Land Parcels



Other Upgrades and Actions

- New federal courthouse and library
- Relocation of Czech & Slovak museum to higher ground
- Detailed flood response protocols; better connections with contractors
- Extensive floodproofing in new floodplain structures; first floors ‘open’, often w parking; elevation of HVAC equipment; more expensive assets on higher floors
- Middle Cedar River Partnership Initiative: City of CR, upstream conservation districts, ISU, Iowa Soybean Assn.
- **“Lots of little things” and “multiple lines of defense.”**
The city bases preparedness on multiple actions, @ variety of scales, & includes businesses & property owners in **“shared responsibility”** (along with **“a need to respect the floodplain”**)

Multiple Sources of Risk/”Lines of Defense”



Public and Private Investment in Recovery

- Federal funds provided substantial infrastructure and other improvements (along with voluntary buyouts).
- Federal resources stimulated considerable private sector (and state of Iowa) investments in Cedar Rapids;
Over time and as federal taxpayer \$\$ declined, private sector investments increased.

Cedar Rapids and Flood Resilience

- Fewer residents, fewer structures, less infrastructure in vulnerable floodplain areas
- Stronger water systems infrastructure protection
- Heightened citizen awareness of flood risks
- Greater preparedness of public works staff & elected officials
- Heightened appreciation of 'shared responsibility' in FRM
- Collective experience of devastating flood, cleanup, and recovery

2016 Cedar River Flood

- Late September 2016
- 2nd-largest Cedar River flood @ Cedar Rapids
- Differences w. 2008 flood: 2016 flood was not preceded by several weeks of heavy rains, nor by torrential rains during flood crest. Moreover, the city had been through the 2008 flood and “no one panicked.”
- City erected ~10 miles of ‘HESCO’ sand-filled barriers
- City better prepared to connect with and recruit services of contractors
- City emerged with ~\$25M damages
- Smaller floods may help city and public works “**keep its edge.**”

Lessons from the 2008 Cedar River Flood

- 1) The 2008 Cedar River flood was unprecedented in terms of discharge and damages. \$5.4B in losses--Iowa's largest natural disaster.
- 2) Flood magnitude/damages catalyzed numerous post-flood initiatives and actions - a smaller flood would have initiated less action.
- 3) Collective experience of living through & recovering from disaster provided greater sense of community, cooperation, adaptability (*"Save our City"*).
- 4) Criteria, analytical guidance, & agencies involved post-flood recovery (reactive) activities are different than those in traditional water project evaluation & investments (proactive).
- 5) Post-2008 changes in Cedar Rapids illustrate national-scale FRM paradigm shifts. More resources available via post-disaster, emergency supplemental actions.

Lessons from the 2008 Cedar River Flood

- 6) Cedar Rapids' resilience to floods has increased.
- 7) Value and importance of shared responsibility, multiple actions at different scales, and cumulative value of numerous, smaller actions.
- 8) Flood risk management as a learning **process**, extending into perpetuity—not a fixed endpoint that once reached, is “completed.”
- 9) The 2016 flood – although smaller than 2008 – illustrated increased resilience & improved flood preparedness and response capacities.
- 10) Comprehensive flood risk management entails integrated water resources management, and watershed-scale coordination and actions.

“Many, many people in our community will say they would not wish a flood like that on anyone, but it’s the best thing that has happened to us”

Chuck Peters, Chairman of Foliance /Cedar Rapids Gazette

Wall Street Journal, September 18, 2017